

The GM Ovonic Nickel Metal Hydride Electric Vehicle Battery

ABSTRACT

In March 1994, General Motors together with Energy Conversion Devices and its subsidiary Ovonic Battery Company announced the formation of a joint venture company, GM Ovonic L.L.C., to commercialize Ovonic nickel metal hydride (NiMH) batteries for electric vehicles. Ovonic Battery Company (Ovonic), with support from the United States Advanced Battery Consortium (USABC), has actively pursued development of their patented and proprietary battery technology for electric vehicle applications.

Since receiving the initial USABC development contract in May 1992, Ovonic progressed from demonstration of small prismatic cells to full-size NiMH EV battery packs in less than two years. Continued technology development under USABC contracts showed steady progress in energy density, cycle life, self-discharge, and other key performance characteristics. Cells, modules, and battery packs delivered to USABC consistently met program goals and approached all USABC mid-term technical criteria. Additionally, in advanced development work funded by USABC, significant gains were demonstrated in specific energy through the use of advanced electrode materials and cell designs. While further development of the advanced concepts incorporated in these high energy cells is required to meet all performance goals, this USABC program successfully demonstrated that Ovonic NiMH technology holds the promise of significantly exceeding USABC mid-term goals for energy.

In this poster presentation, the status of USABC development programs is summarized as well as the current status of the GM Ovonic NiMH battery for EV applications. Performance of the production design is shown relative to USABC mid-term technical goals. Additionally, demonstrated vehicle performance is described for a range of vehicles incorporating Ovonic and GM Ovonic NiMH battery packs. Tests carried out at EV America allowed for evaluation of the performance capabilities of these batteries under severe "real world" conditions for a passenger sedan and full size pick up truck, as well as an advanced ground-up EV. Vehicles equipped with GM Ovonic NiMH packs consistently achieve more than twice the vehicle range obtained with lead acid batteries, while showing quick acceleration, operation over a wide temperature range, and durability.

As this battery technology moves forward into commercialization, development activities continue, with particular emphasis on battery characterization and validation and activities to reduce battery cost. Cost reduction initiatives encompass all aspects of electrode and battery design and are expected to significantly accelerate successful commercialization of the GM Ovonic battery by pulling forward cost savings. GM Ovonic, in collaboration with Ovonic, continues to pursue advanced product development to further improve battery performance and reduce cost through advanced materials, advanced cell designs, and advanced battery management.